IS 15612-2 (2006): Textiles - Burning behaviour of Curtains and drapes, Part 2: Measurement of flame spread of vertically oriented specimens with large ignition source [TXD 32: Textiles Protective Clothing]

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भारतीय मानक

वस्त्रादि — पर्दों और ड्रैपों का ज्वलन व्यवहार

भाग 2 टंगे नमूनों के बड़े प्रज्वलन स्रोत द्वारा ज्वाला फैलाव का मापन

Indian Standard

TEXTILES — BURNING BEHAVIOUR OF CURTAINS AND DRAPES

PART 2 MEASUREMENT OF FLAME SPREAD OF VERTICALLY ORIENTED SPECIMENS WITH LARGE IGNITION SOURCE

ICS 13.220.40;59.080.30

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Price Group 6

FOREWORD

This Indian Standard (Part 2) was adopted by the Bureau of Indian Standards, after the draft finalized by the Chemical Methods of Test Sectional Committee had been approved by the Textile Division Council.

The flammability is one of the important properties of textile materials apart from other characteristics such as combustion, thermal degradation, smouldering, after glow, smoke and toxicity. With the increasing awareness of fire hazards and promulgation of fire safety Rules and Regulations in several advanced countries, development of standards on burning behaviour of textiles needs no emphasis.

In order to keep pace with the technological advances in the testing of burning behaviour of textile fabrics intended for curtains and drapes, and similar uses such as drapes and hangings, formulation of standards based on latest practices at international level is essential.

This standard is based on EN 13772 : 2003 'Burning behaviour of curtain and drapes — Measurement of flame spread of vertically oriented specimens with large ignition source' and specifies flame spread using this more severe ignition source. With this combined ignition source some materials, not ignitable with the small flame, may ignite. Some of these will self extinguish, when the action from the ignition source has ceased, while other will self propagate.

IS 15590 : 2005 measures the flame spread of vertically oriented specimens ignited with a defined small flame. There is however a risk that products not ignitable with a small flame can be ignited with a more severe ignition source. The equipment used in IS 15590 : 2005 has therefore been modified with a radiator, which radiates on the lower part of the specimen. The combination of this radiation and the small flame application simulates the action from a larger flaming source, for example, a burning waste paper basket.

The other parts in this series are:

Part 1 Classification scheme

Part 3 Method for determining the ignitability of vertically oriented specimens (small flame)

Part 4 Method for determining the flame spread of vertically oriented specimens

The composition of the Committee responsible for formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounding off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILES — BURNING BEHAVIOUR OF CURTAINS AND DRAPES

PART 2 MEASUREMENT OF FLAME SPREAD OF VERTICALLY ORIENTED SPECIMENS WITH LARGE IGNITION SOURCE

1 SCOPE

This standard (Part 2) specifies a method for the measurement of flame spread of vertically oriented textile fabrics intended for curtains and drapes in the form of single or multi-component (coated, quilted, multilayered, sandwich construction and similar combinations) fabrics using a large ignition source.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
IS 15370 : 2005/ ISO 6330 : 2000	Textiles — Domestic washing and drying procedure for textile testing
IS 15590 : 2005/ ISO 6941 : 1984	Textile fabrics — Burning behaviour — Measurement of flame spread properties of vertically oriented specimens

3 DEFINITION

For the purposes of this Indian Standard, the following definition shall apply:

3.1 Flaming Debris

Material separating from the specimen during the test procedure, falling below the initial edge of the specimen and igniting a filter paper.

4 PRINCIPLE

A heat flux of a defined energy is applied to a specified area of the lower part of the backside of the vertical specimen. After a period of exposure of 30 s, the small flame defined in IS 15590 is applied for 10 s to a small piece of cotton fabric fixed around the bottom edge of the specimen. The possible flame spread is measured through the severance of marker threads.

5 HEALTH AND SAFETY OF TEST OPERATOR

Burning materials may produce smoke and toxic gases which can affect the health of operators. Between tests the atmosphere of the testing location, which should be of adequate dimensions to avoid endangering the health of operators, should be cleared of smoke and fumes by an extractor fan or other means of ventilation.

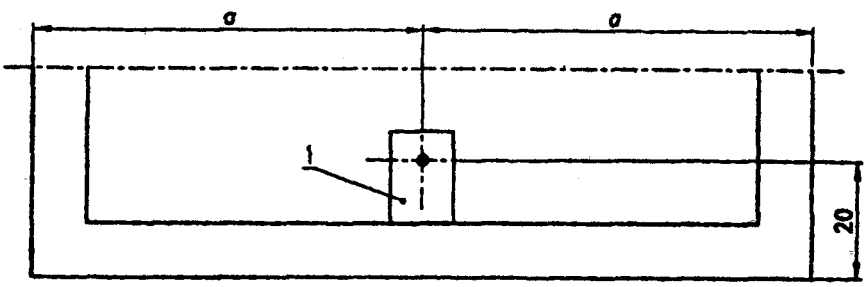
6 APPARATUS AND MATERIALS

6.1 General

This standard uses the equipment according to IS 15590 modified as follows.

6.1.1 *Specimen Holder*

The specimen holder according to IS 15590 has to be modified. To prevent the cotton cloth from falling down the specimen holder, it shall be equipped with an extra pin positioned centrally 20 mm from the bottom of the specimen on the holder (*see* Fig. 1).



All dimensions in millimetres.

FIG. 1 LOWER PART OF THE SPECIMEN HOLDER ACCORDING TO IS 15590 EQUIPPED WITH AN EXTRA PIN

6.1.2 *Electric Radiator*

This radiator is made of a ceramic material and radiates over a circular area of diameter 100 ± 5 mm. The radiator is heated by an electric resistor, formed in a spiral, which is covered by a 1 to 1.5 mm thick layer of transparent quartz.

6.1.3 *Transformer*

An electric transformer to set the voltage needed to get the heat radiation according to 7.

6.1.4 *Copper Disc Calorimeter*

The calorimeter and allied equipment shall be in accordance with Annex A.

6.1.5 *Shield*

A movable shield is located between the radiator and the specimen. The approximate position is given in Fig. 3. The shield shall be at least as wide as the specimen and made in a non-combustible material. It is sufficient if the lowest 200 mm of the specimen is shielded.

NOTE — The non-combustible material could be for instance metal or mineral silicate.

6.1.6 *Marker Threads*

The marker threads shall be of pure cotton with a linear density of 45 ± 5 tex.

Only the first and the third marker threads as specified in IS 15590 are used.

The position of the threads is given in Fig. 2A. The threads shall be under a tension at least equal to that produced by a weight of 50 ± 1 g. A possible arrangement for this is given in the Fig. 2A and 3.

6.1.7 *Gas*

Commercial propane gas shall be used.

6.1.8 *Cotton Cloth*

The cotton cloth shall be bleached fabric of plain weave and weight 160 ± 20 g/m^2. The material shall be washed as per procedure No. 2A and line dried as per procedure A of IS 15370.

6.1.9 *Staple*

To fasten the cotton cloth to the specimen.

6.1.10 *Filter Paper*

Area specific mass 68 ± 6 g/m^2, thickness 0.15 to 0.16 mm, content of alpha cellulose >95 percent.

6.1.11 *Metal Grid*

To be placed horizontally 50 ± 5 mm below the lower edge of the specimen.

6.1.12 *Anemometer*

Capable of measuring air speed at a level of 0.1 to 0.2 m/s.

7 CALIBRATION

7.1 Mount the radiator in work position with its plane area at 65 ± 2 mm from the specimen position and its centre 70 ± 2 mm from the bottom of the specimen (*see* Fig. 3).

7.2 Mount the copper disc calorimeter centrally in front of radiator at the position of the specimen. Put the shield in position and put the radiator on via the transformer. Let at least 20 min elapse. Move the shield aside and let the temperature increase to at least 100°C. Measure the time needed for a temperature rise from 40 to 100°C. The average temperature rise of the calorimeter between 40°C and 100°C shall be 3.0 ± 0.1°C/s.

7.3 If the temperature rise does not fall within the prescribed limits the voltage should be adjusted to a value which fulfils the requirement.

7.4 The calibration shall be carried out at least once a year or more often if it is necessary to keep the calorimeter temperature rise within the prescribed limits.

NOTE — The calibration can alternatively be carried out separately without using the test rig, but the relative positions of the radiator and calorimeter should be maintained.

8 SAMPLE AND TEST SPECIMEN

8.1 Sample

The test sample shall be taken so as to be representative of the materials as used in complete curtains and drapes.

8.2 Cleansing

8.2.1 The sample shall be submitted to one cycle of the cleansing procedure given in the care label. If no cleansing procedure is prescribed, the material shall be submitted to one cycle of one of the following standard cleansing procedure as appropriate to the fabric:

a) wash procedure according to method A of IS 15370 and flat dried in accordance with procedure C of IS 15370; and

b) dry cleansing procedure according to Annex C.

8.2.2 If the fabric is not intended to be cleansed, it shall be tested as received.

NOTE — This cleansing is not intended as a durability test for flame retardant treatment but only to remove

non-durable finishes or contamination and to obtain fabric surfaces and structure characteristics which are representative of those typically obtained in fabrics during actual use.

8.3 Test Specimen

8.3.1 *General*

The test specimens shall be cut from the sample after cleansing.

8.3.2 *Size*

The size of each specimen shall be 560 mm × 170 mm.

8.3.3 *Number*

Cut four specimens from each of the length direction and the width direction. Extra specimens may be needed if re-testing is necessary.

The specimens shall consist of one or more layers of materials according to the construction of the curtain.

Unless otherwise specified the specimens shall not contain features of construction such as seams, pleats, etc. Nevertheless the test specimens shall contain pattern or design features when they are a specific part of the fabric such as Jacquard construction.

8.3.4 *Insertion of Cotton Cloth*

The size of each cotton cloth shall be 50 mm × 20 mm. Take a piece of the cotton cloth and fasten it on the specimen at the ignition point. This is done by folding it around the specimen edge and fastening it with a staple (*see* Fig. 2B).

9 CONDITIONING

Condition the test specimen at least 24 h in the standard atmosphere of 27 ± 2°C and 65 ± 2 percent RH.

10 PROCEDURE

10.1 Hold the anemometer at the same height as the centre of the radiator at the position of the specimen and keep the vertical air movement at less than 0.2 m/s.

10.2 Mount the burner in the position for edge ignition defined in IS 15590.

10.3 Light the burner, adjust the length of the flame (vertical position) to 40 mm.

10.4 Put on the radiator, using the same distance to the specimen and the same adjusted voltage as used in the calibration and let at least 20 min elapse before the first test.

10.5 Move the shield in position between the radiator and the specimen holder.

10.6 Mount a specimen, taken in the length direction, and the first and the third marker threads. Note which side of the specimen is turned to the radiator. Position a piece at least 150 mm × 100 mm of filter paper on the metal grid below the specimen.

10.7 Remove the shield and expose the fabric to radiation. Move the burner into position after 30 s radiation and let it be there for 10 s (the specimen shall still be under radiation and remain so during the whole test).

10.8 Measure the times from the start of the flame application to the severance of the marker thread.

10.9 Note as flaming debris, any debris from the specimen that ignites the filter paper.

10.10 Remove the specimen from the test rig and place it on a flat horizontal surface. Measure the destroyed length defined as the distance from the original edge to the farthest evidence of damage to the specimen due to flame impingement or radiation. Include areas of partial or complete consumption, charring embrittlement, but not areas sooted, stained, warped or discoloured.

10.11 Test another specimen in the same direction exposing the other side to the radiator, making the same measurements. Note which side gives the worst result:

a) By noting which marker threads are reached;
b) If the first thread is severed for both specimens, take note of the longest damaged length;
c) If the third thread is severed for both specimens, take note of the time elapsed to the severance of the third thread; and
d) If no marker threads are severed either side can be used for further test.

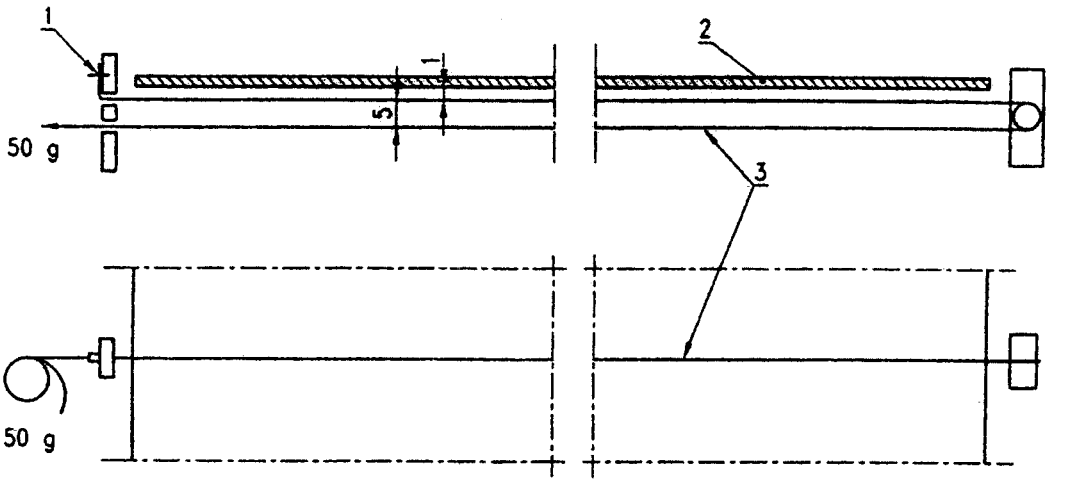
10.12 Test the other two specimens with the side which gave the worst result.

10.13 Test the specimens taken in the width direction in the same way.

11 TEST REPORT

The test report shall include the following information:

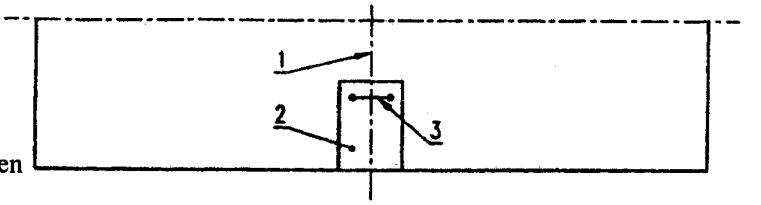
a) Reference to this Indian Standard;
b) Any deviations from this standard;
c) Reference of tested material;
d) Description of the tested material;
e) Date of testing;
f) Cleansing procedure or a statement that the material is not intended to be cleansed;
g) Testing results for individual specimens:
   1) note whether or not the first and third marker thread are severed;
   2) time to severance of the third marker thread;
   3) destroyed length; and
   4) flaming debris according to **10.9**.



Key
1 Fastening point
2 Specimen
3 Marker thread

All dimensions in millimetres.

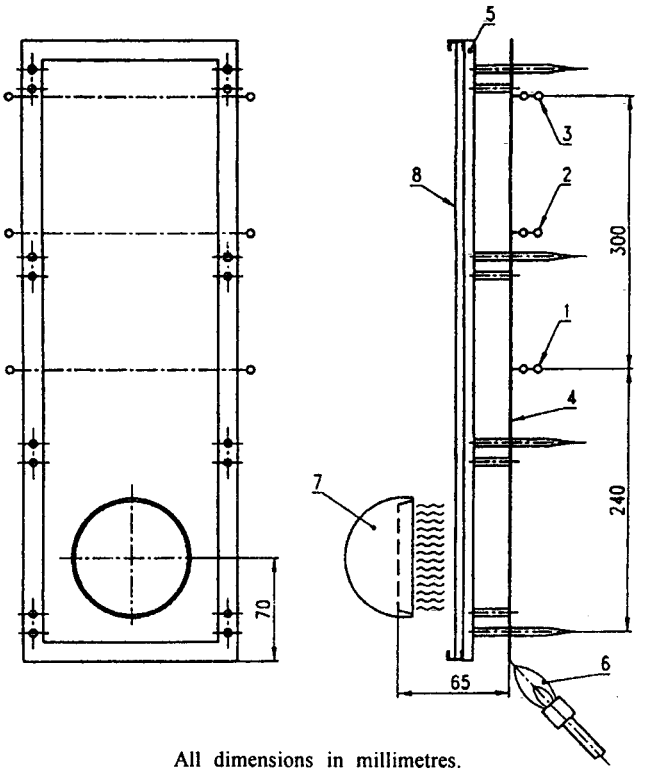
FIG. 2A POSITIONS AND POSSIBLE ARRANGEMENT FOR MARKER THREADS



Key
1 Centre of the specimen
2 Cotton cloth
3 Staple

All dimensions in millimetres.

FIG. 2B POSITION OF PIECES OF COTTON CLOTH ON THE SPECIMEN



Key
1 First marker thread
2 Second marker thread
3 Third marker thread
4 Fabric specimen
5 Specimen holder
6 Flame
7 Radiator
8 Shield

All dimensions in millimetres.

FIG. 3 EQUIPMENT FOR COMBINED TEST WITH HEAT RADIATION AND A SMALL FLAME

ANNEX A
(*Clause* 6.5)

THE CALORIMETER AND ALLIED EQUIPMENT

A-0 GENERAL

The apparatus consists of:

a) Gas burner;
b) Copper disc calorimeter;
c) Specimen support frame;
d) Calorimeter locating plate;
e) Support stand;
f) Suitable measuring equipment; and
g) Template.

A-1 GAS BURNER

A flat-topped Meker burner with a perforated top area 38 ± 2 mm in diameter and a jet suitable for propane gas shall be used. Commercial grade propane shall be used, the flow being controlled by a fine control valve and flowmeter.

A-2 COPPER DISC CALORIMETER

A-2.1 The calorimeter consists of a disc of copper of at least 99 percent purity, having a diameter of 40 mm, a thickness of 1.6 mm, and a mass of 18 g. The disc should be accurately weighed before assembly.

A-2.2 A copper-constantan thermocouple, with an output in milli volts complying with Annex B, is mounted on the copper disc as shown in FIG. A-1. The constantan wire should be attached to the centre of the disc, and the copper wire as close to the edge as possible but so as not to interfere with mounting the disc in the block. The diameter of both wires should be 0.26 mm or less, and only the length attached to the disc should be bared.

A-2.3 The calorimeter is located in a mounting block which consists of a circular, thermally insulating board, 89 mm in diameter and 13 mm thick, made from asbestos-free, non-combustible material.

A-2.4 The thermal Characteristics should comply with the following:

a) Density: 750 ± 50 kg/m^3; and
b) Thermal conductivity: 0.18 W/(m . K) ±10 percent.

A-2.5 A circular cavity is provided in the centre of the block to accommodate the disc, as shown in FIG. A-2. The disc is bonded in position around its circumference with an adhesive capable of withstanding temperatures of about 200°C. The face of the copper disc shall be flush with the surface of the mounting block and be coated with a thin layer of black paint having a coefficient of absorption greater than 0.9.

A-3 SPECIMEN SUPPORT FRAME

The specimen support frame consists of a copper sheet, 150 mm square and 1.6 mm thick, with a 50 mm square hole in its centre (*see* Fig. A-3).

A-4 CALORIMETER LOCATING PLATE

The calorimeter locating plate is an aluminium plate, 149 mm square and 6 mm thick, with a circular hole 90 mm in diameter in its centre (*see* Fig. A-4). The plate shall weigh 264 ± 13 g.

A-5 SUPPORT STAND

A-5.1 A support stand is used to position the specimen support frame relative to the burner. The surface of the specimen support frame should be 50 mm above and parallel to the top face of the burner, with the burner axis aligned with the centre of the opening in the support frame (*see* Fig. A-5).

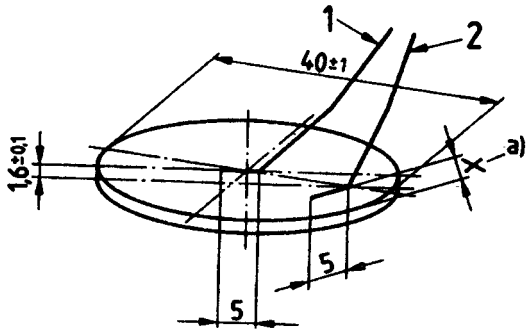
A-5.2 It is convenient to provide a shutter between the burner and the specimen support frame. The shutter should open completely in less than 0.2 s and should be operated immediately after placing the burner in position. It is useful if the positioning of the burner-or the opening of the shutter, if fitted-can be used to record the start of the exposure automatically.

A-6 MEASURING EQUIPMENT

To enable the absolute temperature of the copper disc to be determined, the thermocouple should be connected to either an ice junction or a commercial reference junction. The voltage signal from the thermocouple should be connected to either a suitable potentiometric chart recorder or programmable data recorder. The recorder should enable voltages to be read to 10 μV and times to 0.2 s.

A-7 TEMPLATE

The template shall be flat and rigid, measuring 140 mm × 140 mm.

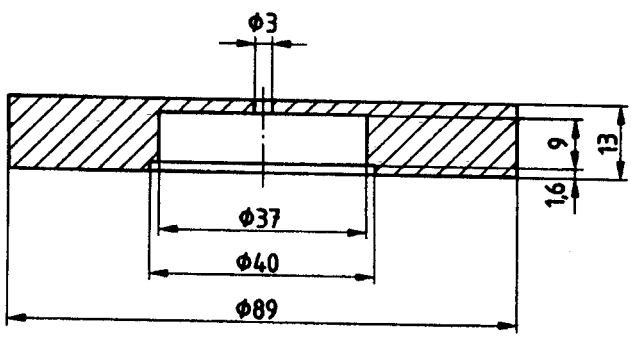


1 Constantan wire
2 Copper wire
a) 2 mm ≤ × ≥ 5 mm, so as not to interfere with the seating of the disc in the mounting block but still as near the edge as possible.

Wires attached to disc by a minimum amount of softsolder.

All dimensions in millimetres.

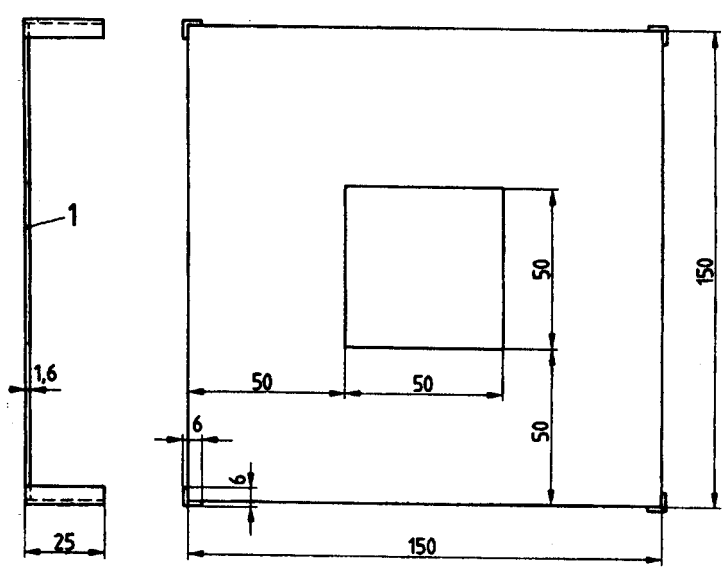
FIG. A-1 CALORIMETER



Material: Monolux 500 or the equivalent

All dimensions in millimetres.

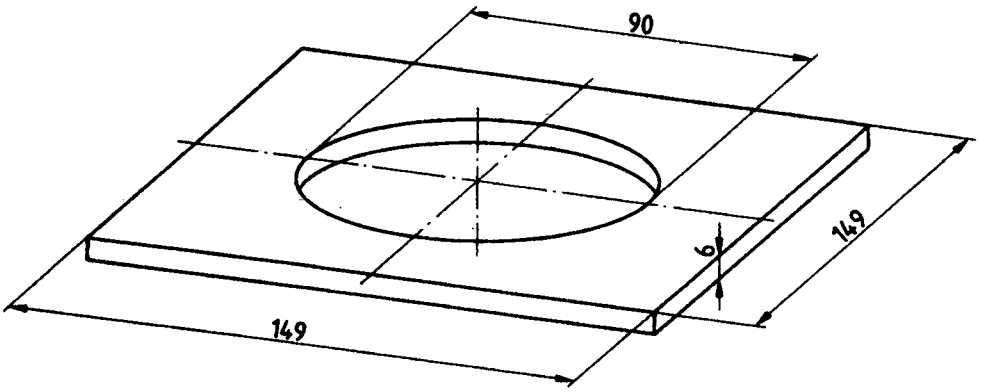
FIG. A-2 CALORIMETER MOUNTING BLOCK



1 Copper sheet

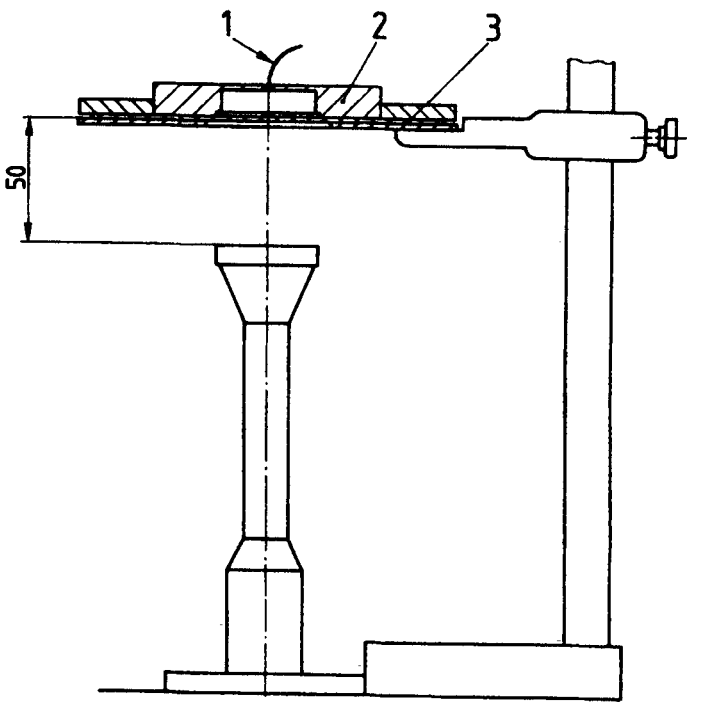
All dimensions in millimetres.

FIG. A-3 SPECIMEN SUPPORT FRAME



All dimensions in millimetres.

FIG. A-4 CALORIMETER LOCATING PLATE



1 Thermocouple
2 Mounting block
3 Specimen

All dimensions in millimetres.

FIG. A-5 SUPPORT STAND

ANNEX B
(*Clause* A-2.2)

REFERENCE TABLE OF ELECTROMOTIVE FORCE AS A FUNCTION OF TEMPERATURE OF TYPE T THERMOCOUPLES (COPPER/CONSTANTAN)
(Excerpt from IEC – Publication 584-1:1977)

Type T Copper/Constantan											
Electromotive force as a function of temperature, in EμV											
t_{68} °C	0	1	2	3	4	5	6	7	8	9	t_{68} °C
0	9	39	78	117	156	195	234	273	312	351	0
10	391	430	470	510	549	589	629	669	709	749	10
20	789	830	870	911	951	992	1 032	1 073	1 114	1 155	20
30	1 196	1 237	1 279	1 320	1 361	1 403	1 444	1 486	1 528	1 569	30
40	1 611	1 653	1 695	1 738	1 780	1 822	1 865	1 907	1 950	1 992	40
50	2 035	2 078	2 121	2 164	2 207	2 250	2 337	2 337	2 380	2 424	50
60	2 467	2 511	2 555	2 599	2 643	2 687	2 731	2 775	2 818	2 864	60
70	2 908	2 953	2 997	3 042	3 087	3 131	3 176	3 221	3 266	3 312	70
80	3 357	3 402	3 447	3 493	3 538	3 584	3 630	3 676	3 721	3 767	80
90	3 813	3 859	3 906	3 952	3 998	4 044	4 091	4 137	4 184	4 231	90
100	4 277	4 324	4 371	4 418	4 465	4 512	4 559	4 607	4 654	4 701	100
110	4 749	4 796	4 844	4 891	4 939	4 987	5 035	5 083	5 131	5 179	110
120	5 227	5 275	5 324	5 372	5 420	5 469	5 517	5 566	5 615	5 663	120
130	5 712	5 761	5 810	5 859	5 908	5 957	6 007	6 056	6 105	6 155	130
140	6 704	6 254	6 303	6 353	6 403	6 452	6 502	6 552	6 602	6 652	140
150	6 702	6 753	6 803	6 853	6 903	6 954	7 004	7 055	7 106	7 156	150
160	7 207	7 258	7 309	7 360	7 411	7 462	7 513	7 564	7 615	7 666	160
170	7 718	7 769	7 821	7 872	7 924	7 975	8 027	8 079	8 131	8 183	170
180	8 235	8 287	8 339	8 391	8 443	8 495	8 548	8 600	8 652	8 705	180
190	8 757	8 810	8 863	8 915	8 968	9 021	9 074	9 127	9 180	9 233	190
200	9 268	9 339	9 392	9 446	9 499	9 553	9 606	9 659	9 713	9 767	200
210	9 820	9 874	9 928	9 982	10 036	11 090	10 144	10 198	10 252	10 306	210
220	10 360	10 414	11 469	10 532	10 578	10 632	10 687	10 741	10 796	10 851	220
230	10 905	10 960	11 015	11 070	11 125	11 180	11 235	11 290	11 345	11 401	230
240	11 456	11 511	11 566	11 622	11 677	11 733	11 788	11 844	11 900	11 956	240
250	12 011	12 067	12 123	12 179	12 235	12 291	12 347	12 403	12 459	12 515	250
260	12 572	12 628	12 684	12 741	12 797	12 854	12 910	12 967	13 094	13 080	260
270	13 137	13 194	13 251	13 307	13 364	13 421	13 478	13 535	13 592	13 650	270
280	13 707	13 764	13 821	13 879	13 936	13 993	14 051	14 108	14 166	14 223	280
290	14 281	14 339	14 396	14 454	14 512	14 570	14 628	14 686	12 744	14 802	290

ANNEX C
(*Clause* 8.2.1)

DRY-CLEANING PROCEDURE

C-1 REAGENTS

C-1.1 Tetrachloroethene, $CCl_2 = CCl_2$ distilled, sold for the purpose of dry cleaning.

C-1.2 Sorbitan Mono-Oleate

NOTE — In order to prevent foaming, it is important to use redistilled, clean solvent solution and not overfill the still.

C-2 APPARATUS

C-2.1 Dry-cleaning machine, consisting of a commercial reversible rotating cage type, totally enclosed machine intended for use with tetrachloroethene. The diameter of the rotating cage shall be 600 mm minimum and 1 080 mm maximum. Its depth shall be 300 mm minimum. It shall be fitted with three or four lifters. The speed shall be such as to give a *g*-factor between 0.5 and 0.8 for cleaning and between 60 and 120 for extraction.

NOTE — The *g*-factor is calculated according to the following formula:

$$g = 5.6\, n^2 d \times 10^{-7}$$

where

n — rotational frequency, in rotations per minute;

d — rotating cage diameter, in millimetres.

C-2.1.1 The machine shall be fitted with the means to control solvent and air temperature as required (*see* Table 1).

C-2.1.2 The machine shall have suitable facilities to allow the emulsion (*see* **C-3.1.3**) to be introduced gradually into the solvent between the cage and drum below the level of the solvent.

C-2.1.3 The machine shall be equipped with a means of measuring the temperature of the solvent during washing and either the incoming or the outgoing air during drying to within ±2°C.

C-3 PROCEDURE

C-3.0 Selection of the procedure to be used (normal, sensitive or very sensitive) depends on the textile item (*see examples* **C-3.2**). It should also take into consideration the end use to which the item will be put since this will have a bearing on the likely type and degree of soiling. Cleaning will be generally less effective the less severe the process. Localised staining and stain removal currently falls outside the scope of this International Standard.

C-3.1 Procedure for Normal Materials

C-3.1.1 The mass of the complete load, measured to ±0.1 percent, shall be calculated from the cage volume, for normal materials in the proportion of 50 ± 2 kg/m³ and for sensitive and very sensitive materials in the proportion of 33 ± 2 kg/m³. Unless the mass of a single specimen (fabric, composite or garment) exceeds 10 percent of the mass of the load, the mass of the test specimen(s) shall not exceed 10 percent of the mass of the load. The remainder of the load shall consist of ballast.

C-3.1.2 Place the conditioned load in the machine and charge the machine with distilled tetrachloroethene, containing 1 g/l of sorbitan mono-oleate so that the liquor ratio, calculated from the volume of solvent in the drum, is 5.5 ± 0.5 l/kg of the load. Maintain the solvent at 30 ± 3°C throughout the cleaning operation.

C-3.1.3 Prepare a fresh emulsion by mixing per kilogram of load, 10 ml of sorbitan mono-oleate with 30 ml of tetrachloroethene and then whilst stirring adding 20 ml of water. This corresponds to 2 percent of water calculated on the mass of the load.

C-3.1.3.1 If the mixing of the detergent with tetrachloroethene outside the machine is not permitted, a mixture of the detergent and water may be added directly into the machine. Precautions shall be taken to avoid uneven distribution of the individual components in the load. Any deviation from the procedure shall be noted in the test report.

C-3.1.3.2 Start the machine with the filter circuit shut off, and 2 min after the cage inlet has closed, add the emulsion slowly over a period of 30 ± 5 s to the machine between the cage and the drum below the level of the solvent.

C-3.1.4 Switch the machine on and allow it to run for 15 min. Do not use the filter circuit for the duration of the test.

C-3.1.5 Drain the solvent and centrifugally extract the solvent from the load for 2 min (including at least 1 min at full extraction speed).

C-3.1.6 Introduce pure dry solvent at the same liquor ratio as that given in **C-3.1.2** and rinse for 5 min. Drain and extract again for 3 min (including at least 2 min at full extraction speed).

C-3.1.7 Dry the load in the machine air for an appropriate time, preferably using an automatic solvent dryness control.

After drying, blow air, at ambient temperature, through the rotating load for at least 5 min.

C-3.1.8 Immediately remove the test piece from the machine. Place garments individually on hangers and place fabric specimens on a flat surface, for at least 30 min.

C-3.2 Procedures for Sensitive and Very Sensitive Materials

Proceed as in **C-3.1**, but with the appropriate parameters at the reduced levels given in Table 1.

Examples:

a) An acrylic item may be temperature sensitive and so the drying temperature may be reduced to 60 ac air inlet, 50 ac air outlet, and the remaining parameters maintained in accordance with the "normal" procedure.

b) An angora item will be very sensitive to mechanical action and water addition. Thus the machine loading will be reduced to 66 percent, no water addition, wash time reduced to 5 min, rinse time reduced to 3 min and final extract time to 2 min. It may also be processed in a net bag. Other parameters will be in accordance with the "normal" procedure.

c) Chlorofibre fabric will be very sensitive to time in solvent and drying temperature. The procedure may be 66 percent loading, wash time reduced to 5 min, rinse time reduced to 3 min, final extract time reduced to 2 min, drying air inlet temperature reduced to 50°C, outlet to 40°C. All other parameters will be in accordance with the "normal" procedure.

Table 1 Dry-Cleaning Procedure
(*Clauses* C-2.1.1 *and* C-3.2)

Procedure	Load Ratio[1] kg/m³	Solvent Temperature °C	Detergent Charge[2] g/l	Addition of Water[3] Percent	Cleaning Cycle Time min				Drying Temperature[7] °C		Deodorization time[8] min
					Wash[4]	Inter extract[5]	Rinse[6]	Final extract	IN	OUT	
Normal	50 ± 2	30 ± 3	1	2	15	2	5	3	80 ± 3	60 ± 3	5
Sensitive	33 ± 2	30 ± 3	1	0	10	2	3	2	60 ± 3	50 ± 3	5
Very Sensitive	33 ± 2	30 ± 3	1	0	5	2	3	2	50 ± 3	40 ± 3	5

[1] *See* C-3.1.1
[2] *See* C-3.1.2
[3] *See* C-3.1.3
[4] *See* C-3.1.4
[5] *See* C-3.1.5
[6] *See* C-3.1.6
[7] Machine is set to control on IN or OUT condition.
[8] *See* C-3.1.7

ANNEX D
(Foreword)

COMMITTEE COMPOSITION

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